

Curriculum Enhancement through Space Science Research

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OVERVIEW

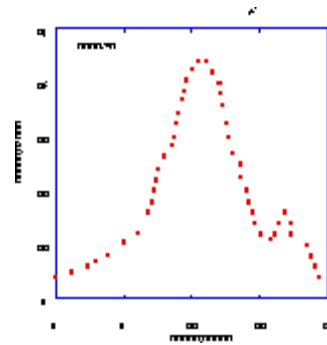
We present an overview of our recently awarded NASA-MURED Partnership Award for the Integration of Research into Undergraduate Education (PAIR). Our program is designed to enhance the curriculum in three departments on campus, Physical Sciences, Electrical & Industrial Engineering and Mathematics & Computer Science. We are in the process of developing new courses and enhancing existing ones using recent discoveries in the field of space science as a common foundation on which to base these curriculum changes.

STUDENT RESEARCH TEAMS

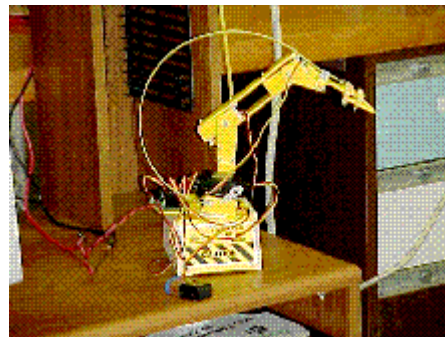
One of the more unique aspects of this project are the cross-departmental student research teams which will work together for a full year under the supervision of a faculty member on topics with ties to space science. Each team will have at least one student from each of the three departments. Each student team is required to give several presentations about their project, including one on campus to the student body as well as at a professional meeting. Four teams of four students each began their research during the summer of 2000.



One team studied radio astronomy, using donated satellite dishes to observe radio signals from the sun. The plot shown here is the strength of the solar radio signal as it crosses the local meridian. Additionally they are constructing a dipole receiver to record radio outbursts from Jupiter as a part of the NASA-sponsored Radio Jove program.



Another student team shown here has begun the construction of a robotic arm which will be capable of moving and pointing a small CCD camera as a first step to automating a telescope.



Another student team is studying data base management with the goal of applying their project to management of a database of astrophysical CCD images.

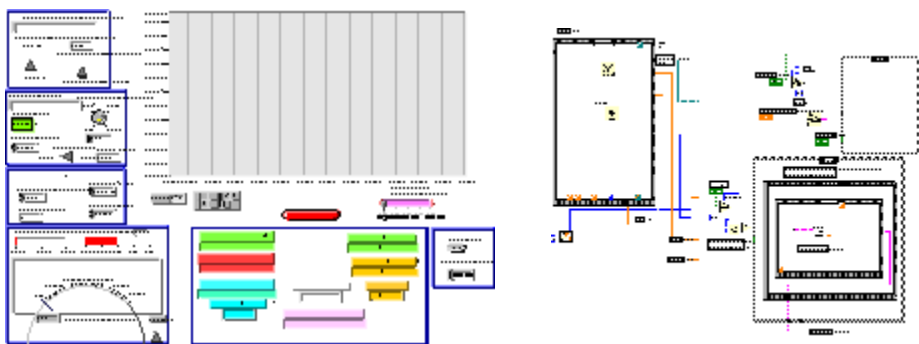
FACULTY DEVELOPMENT

The interdisciplinary nature of this project necessitates participating faculty members be familiar with all of the science and technology topics which are a part of the program. All faculty members funded under project will attend a suite of workshops related to the various components of the project. These will cover topics in astrophysics, computer programming, LabView and modern teaching strategies.



LABVIEW IMPLEMENTATION

The LabView software suite is widely used in industry, government labs and higher education. This visualization software allows one to design, build and test virtual instruments which are then interfaced with real equipment in the laboratory. Through funding from PAIR, SCSU faculty and students will get extensive exposure to its use and applications in our MSET courses as well as in laboratories. This will make both our curriculum and our graduates more competitive.

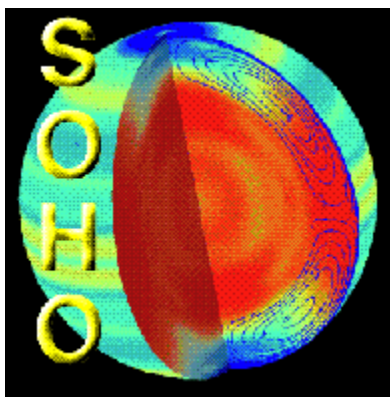


CURRICULUM ENHANCEMENT

Our first success in this area has been the addition to the University curriculum of ETS 468-469, a two-semester, 1-credit hour, course entitled "Interdisciplinary Research Seminar in Space Science" for the PAIR student teams. It is being offered in the fall of 2000 for the first time.

The PAIR project will have a significant impact on the upper-level courses for majors in the departments being supported. New equipment, new teaching strategies and new material will be incorporated into these courses. Lab courses in engineering technology, computer science and physics are being enhanced beginning with the fall 2000 term.

Courses for non-majors will also be impacted, including those taken by preservice teachers. The two-semester physical science lecture and laboratory courses will be enhanced by including a number of new lab exercises, demonstrations and course material. For example, imagery and data from the NASA SOHO website will be used in a new solar physics laboratory exercise.



RECRUITMENT & OUTREACH

The recruitment and outreach components of the project are designed to raise the visibility of the University in the K-12 community statewide. Our Co-I for Outreach, Dr. Linda Payne, is the director of the Bamberg-Calhoun-Orangeburg (BCO) Math/Science Hub, a teacher resource center located on campus.

Through the BCO Hub we will be able to send our student teams out to K-12 schools to conduct demonstrations and talk about their research. Undergraduate students talking to high school students will be a far more effective recruitment tool than sending out our faculty members.

One student team has already been trained to assemble the StarLab portable planetarium (see photo) and conduct indoor tours of the night sky from a school gymnasium.



ACKNOWLEDGEMENTS

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